THE PSYCHOLOGY OF CHOCOLATE

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THE USUAL SUSPECT (S)

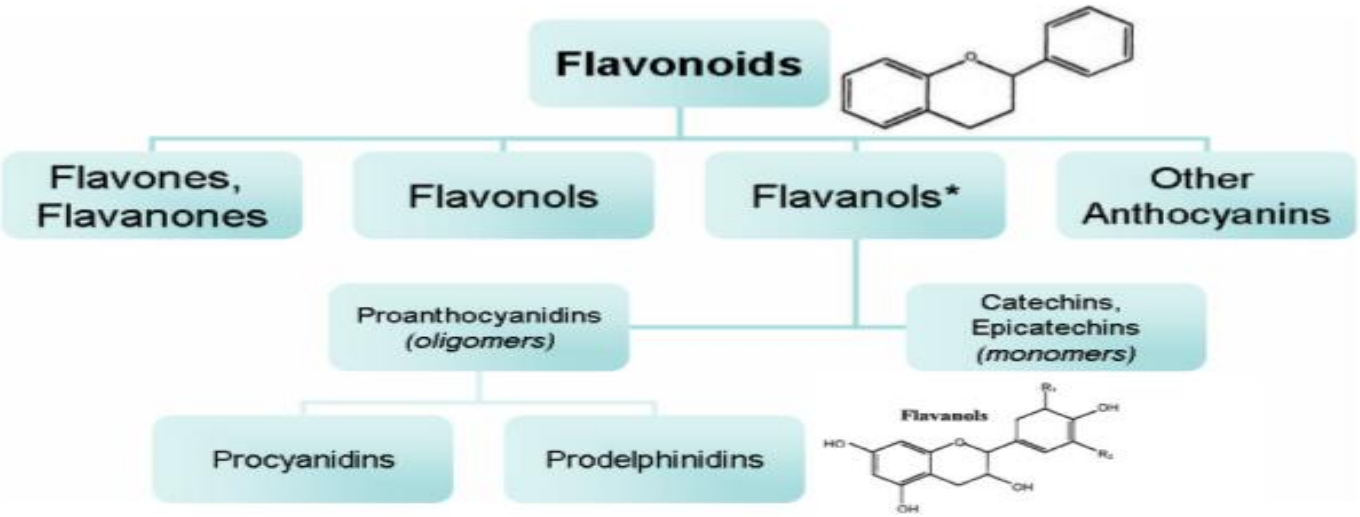


Figure 1
Structural skeleton of flavonoids and classification hierarchy of common flavonoids. *Flavanol is the predominate class of flavonoid found in cocoa and chocolate.

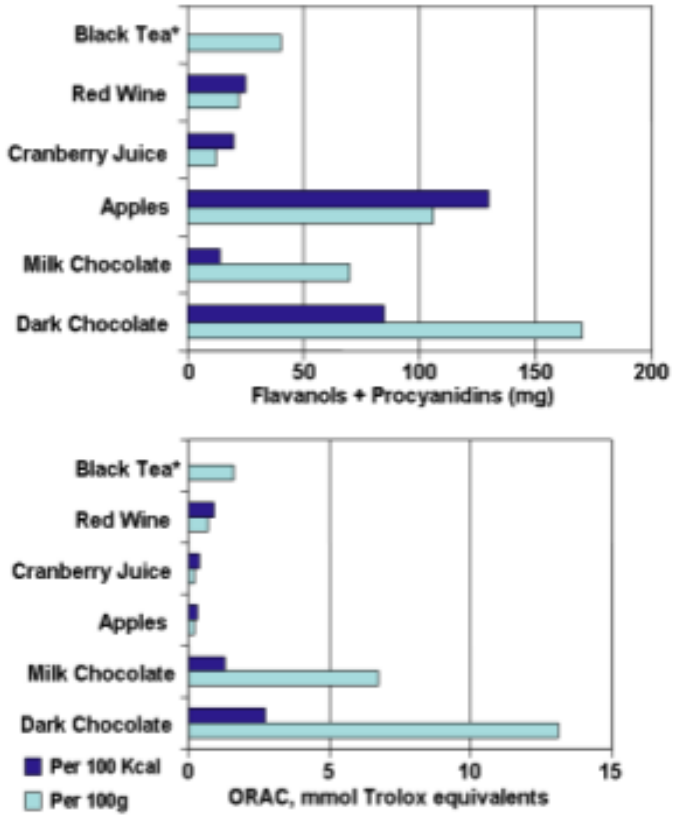


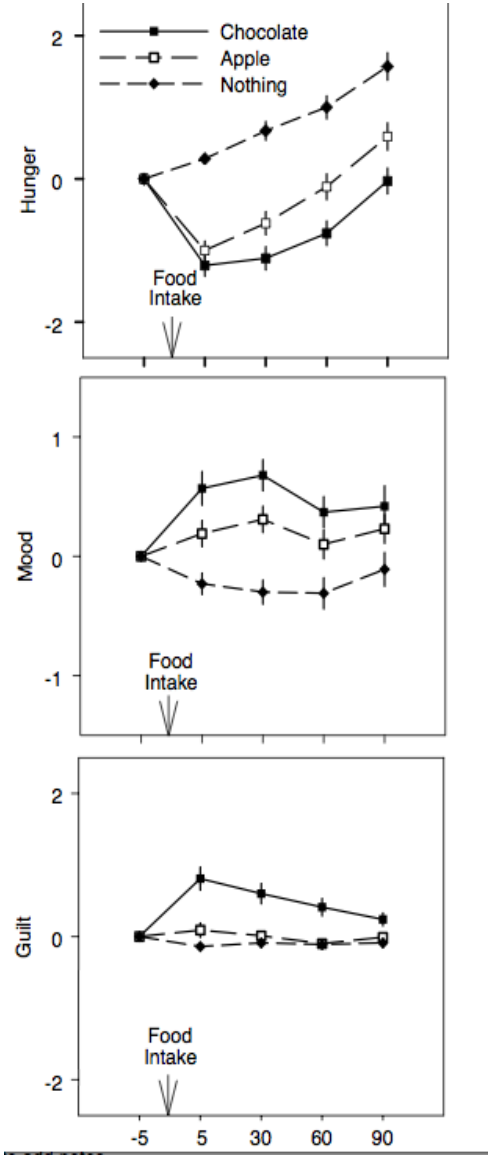
Figure 2
Flavonoid content and antioxidant capacity (ORAC) of milk chocolate and dark chocolate versus other high flavonoid foods. * Brewed, per 2 g bag/200 ml water. Antioxidant activity is reported as oxygen radical absorbance capacity (ORAC). Adapted from: Steinberg et al. J Am Diet Assoc 103: 215-23.

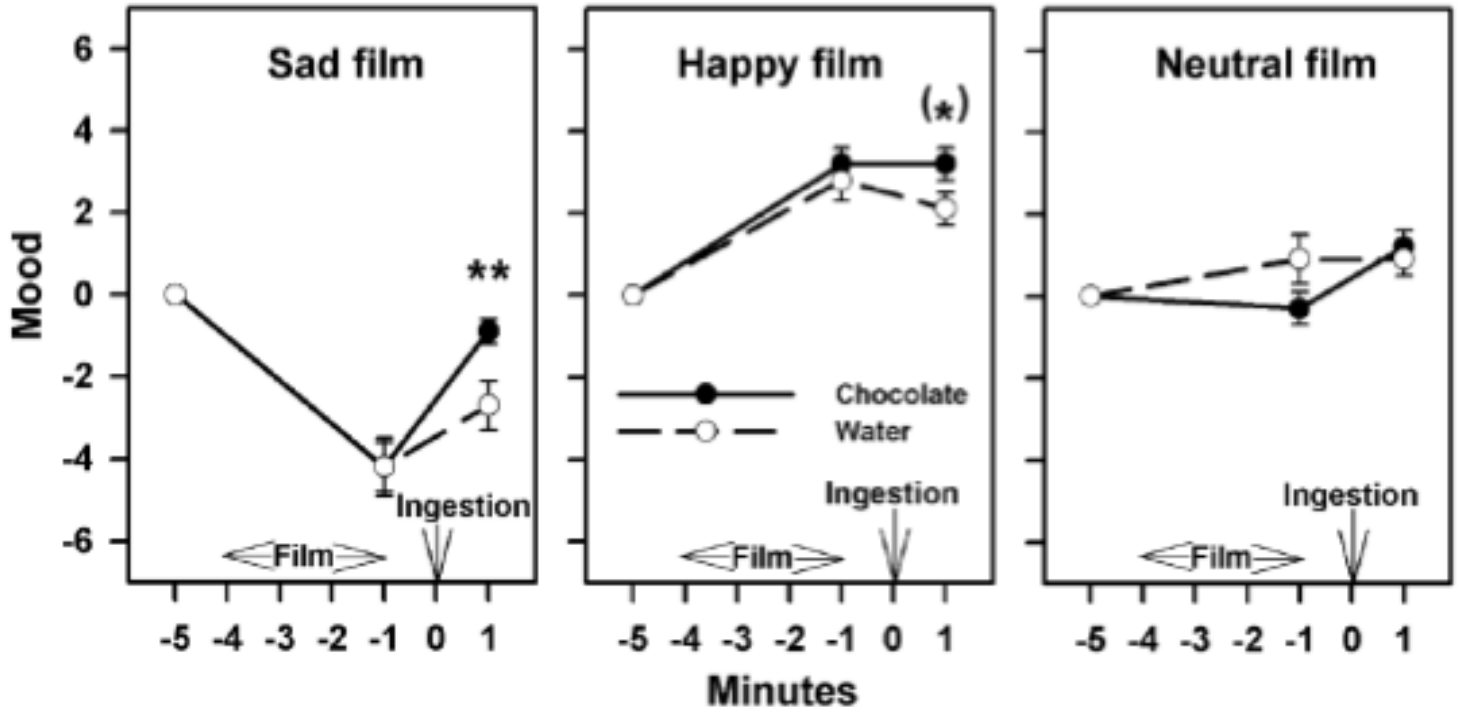
HOW DOES THIS AFFECT BEHAVIOUR?

- People spend longer looking at slides in the presence of chocolate aroma
- More words recalled when learning and recall take place in presence of odour
- When paired with a nice painting, picture is rated artistically better
- Consumption greater in Parkinson’s Disease (Wolz et al, 2009)

DOES CHOCOLATE EATING AFFECT MOOD?

- Apple and chocolate eating improved mood but chocolate's effect was stronger (Macht & Dettmer, 2006)
- Chocolate eating reduced negative mood after watching sad film; no effect on positive mood (Macht & Mueller, 2007)
- Bad mood alleviated after eating palatable chocolate (up to 70% cocoa)- but effect very short-lived


Chocolate
Apple
Nothing
Hunger
2
0
-2
Food
Intake
Mood
1
0
-1
Food
Intake
Guilt
2
0
-2
Food
Intake
-5
5
30
60
90


Sad film
Happy film
Neutral film
(*)
**
Mood
6
4
2
0
-2
-4
-6
Chocolate
Water
Ingestion
Film
-5 -4 -3 -2 -1 0 1
Minutes

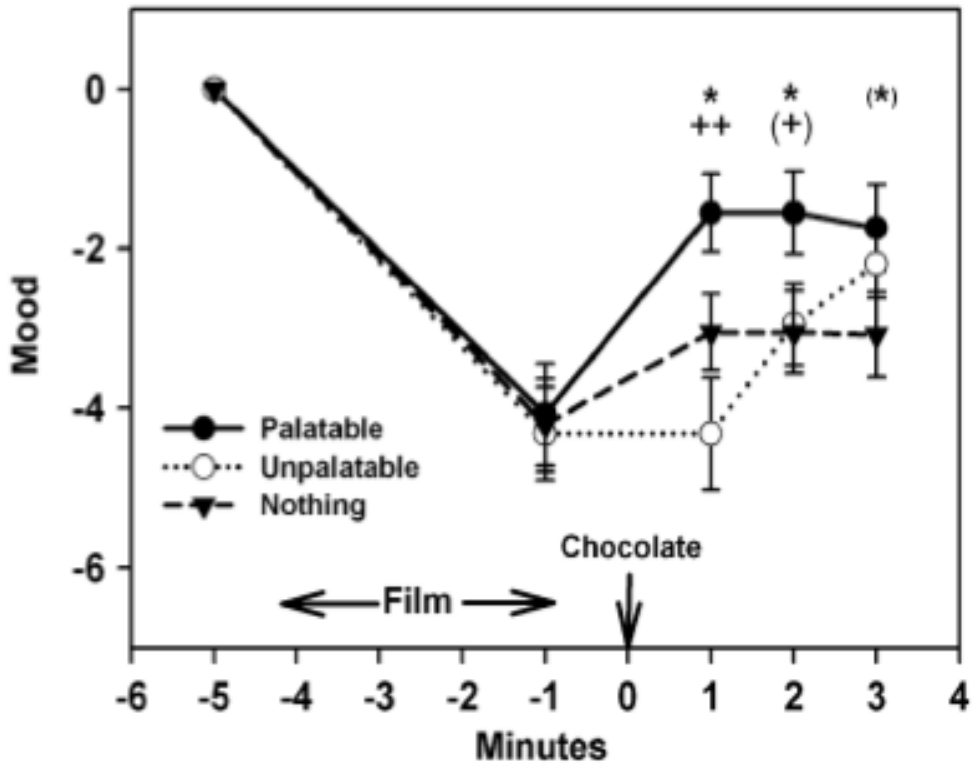


Fig. 2. Self-rated mood (mean ± SEM) before and after viewing a sad film and after ingestion of palatable chocolate ($n = 38$), unpalatable chocolate ($n = 37$) or nothing ($n = 38$). *: $p < 0.05$ and *: $p < 0.10$ for comparisons between palatable chocolate and eating nothing; ++: $p < 0.01$ and +: $p < 0.10$ for comparisons between palatable and unpalatable chocolate.

HERNAN CORTES

- “just one glass was sufficient to refresh a soldier for a whole day”

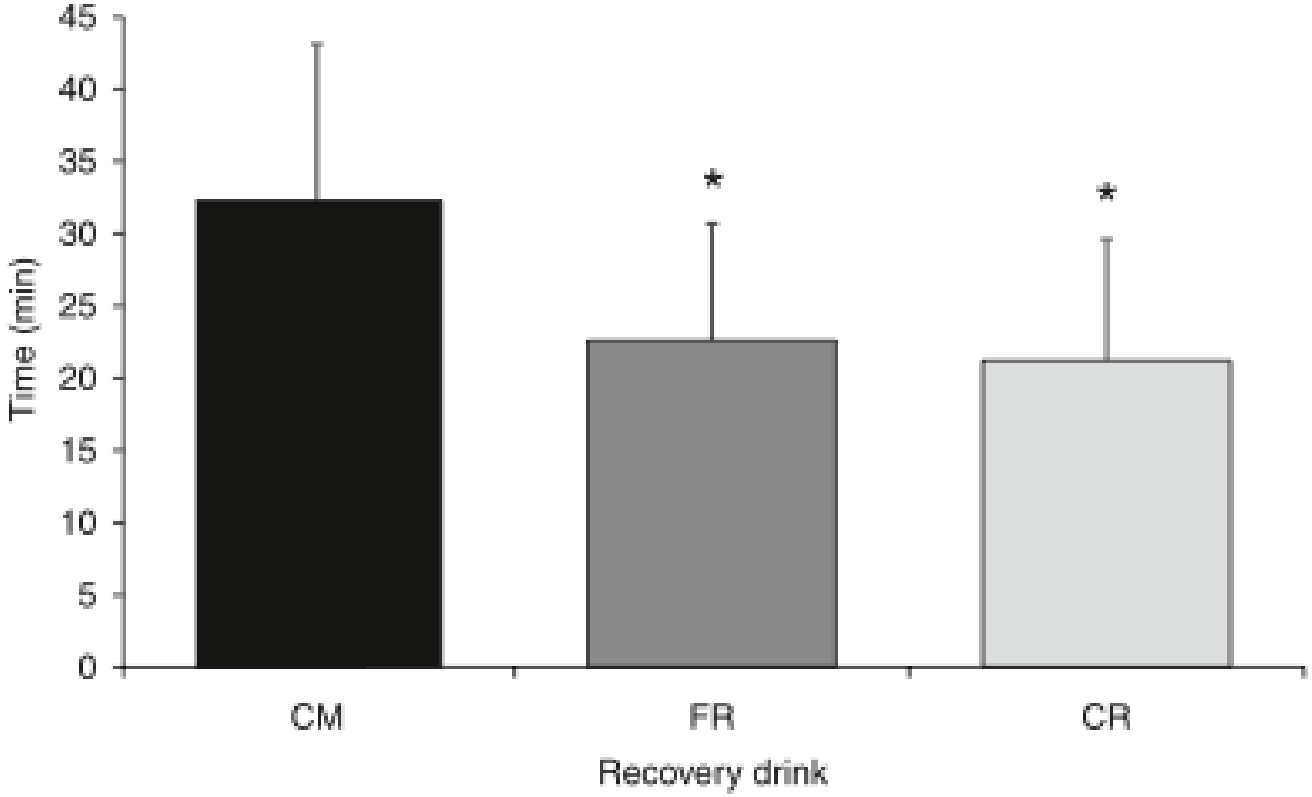
AN AID TO RECOVERY?

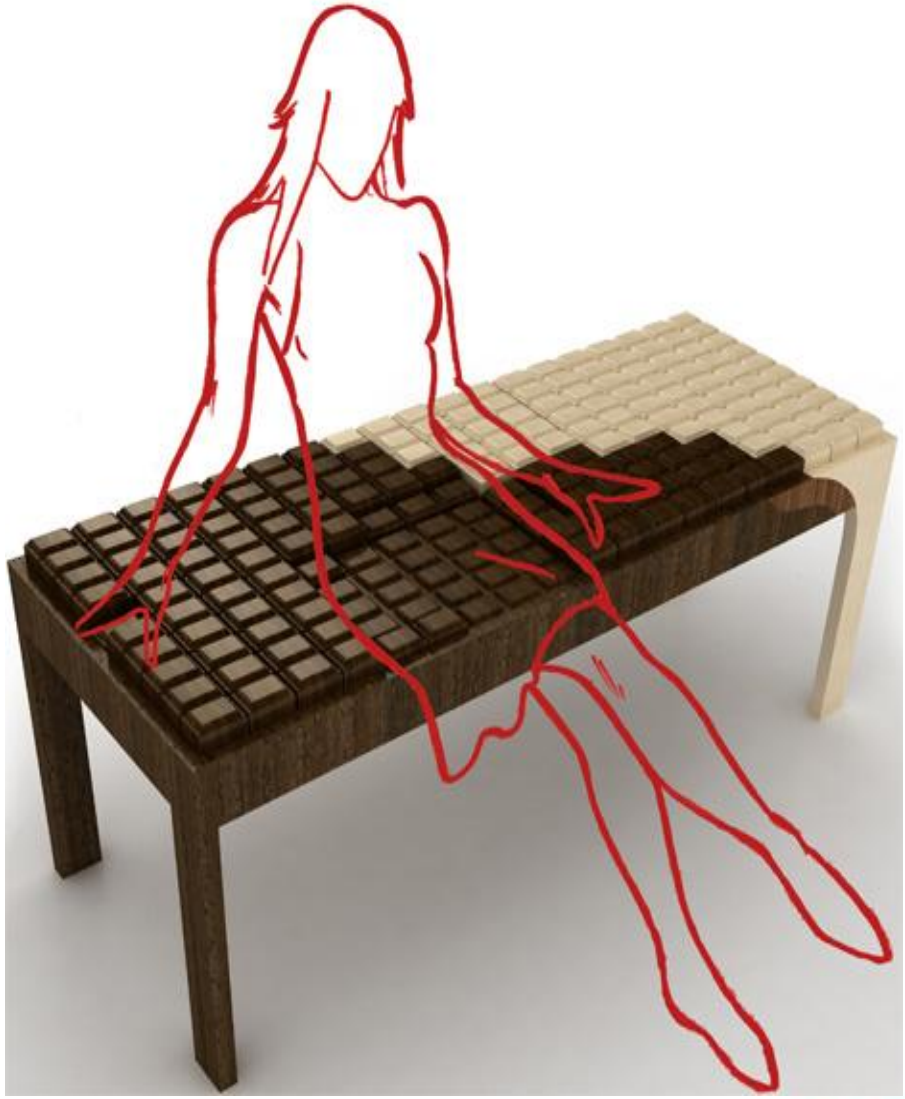
- Cyclists cycle 49%-51% longer after milk choc ingestion (Karp et al, 2006; Thomas et al, 2009)…

- …and become exhausted less quickly (Karp et al, 2006)

- Chocolate urges reduced by exercise (Taylor & Oliver, 2009)

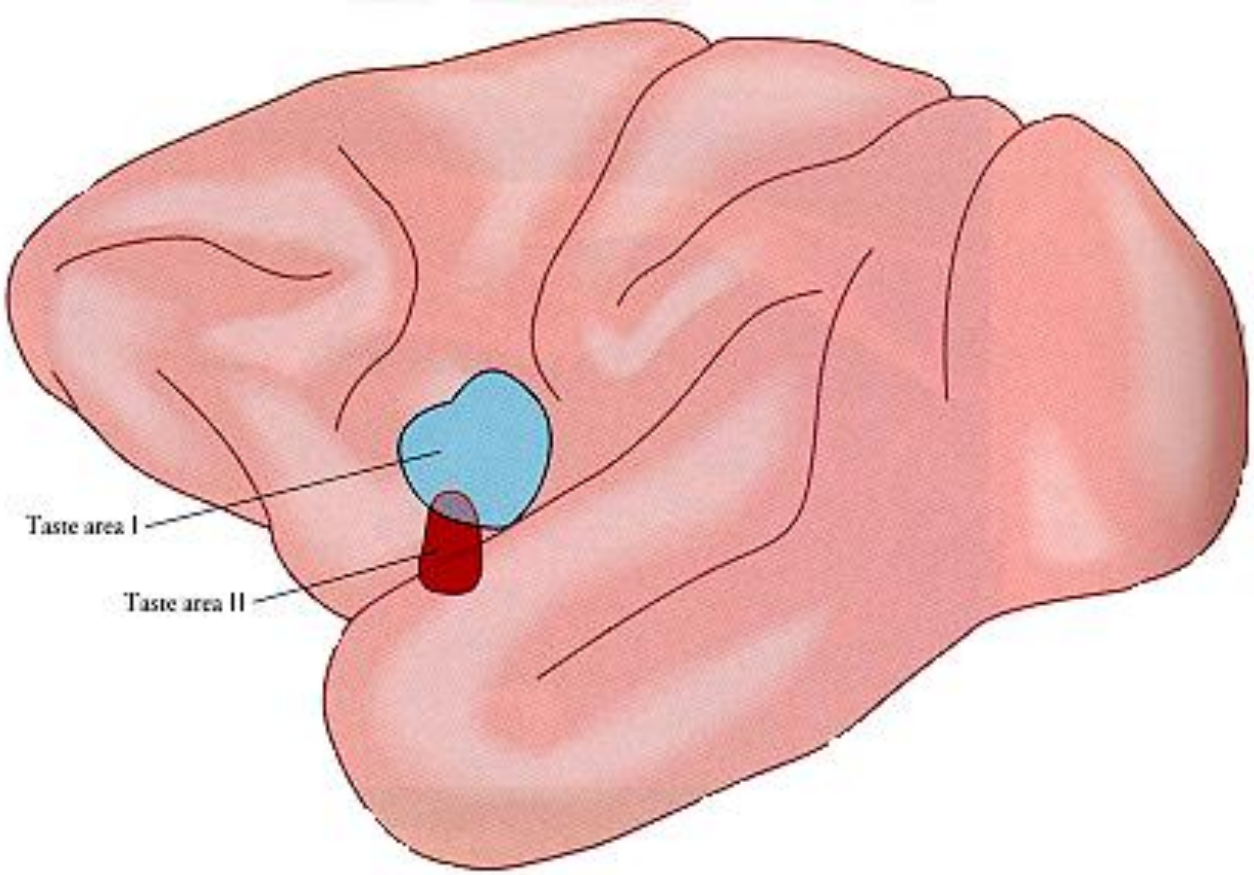
Fig. 2. Time to exhaustion during endurance capacity trial, following ingestion of 3 different recovery drinks. CM, chocolate milk; FR, fluid replacement drink; CR, carbohydrate replacement drink. *, Significantly different from chocolate milk.

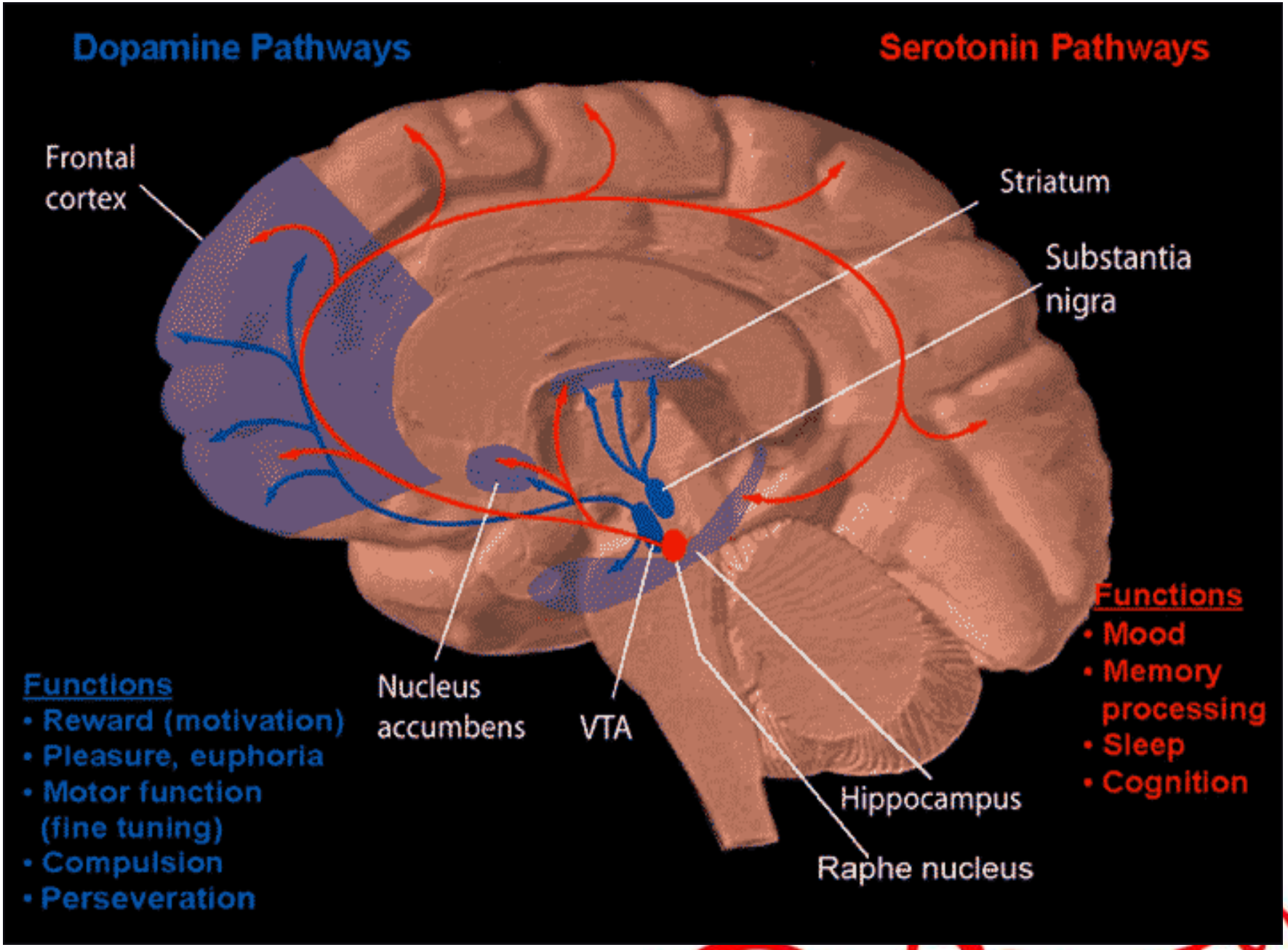




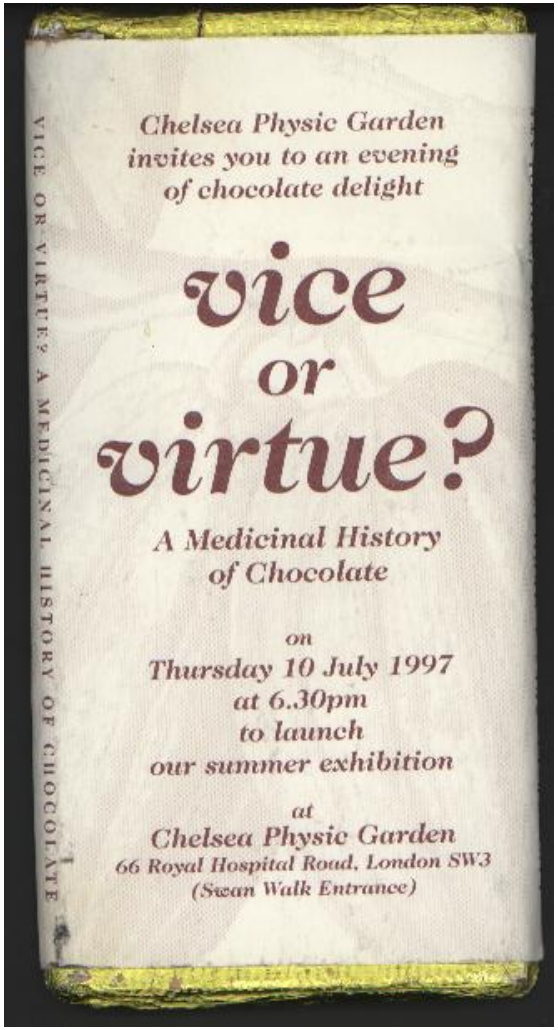
THE NEUROPSYCHOLOGY OF CHOCOLATE

- Eating chocolate to satiety (Small et al, 2001)
- Pleasantness- orbitofrontal cortex/insula
- Satiety- different regions and decrease in OFC
- There are sex diffs (Smeets et al, 2006)


Taste area I
Taste area II

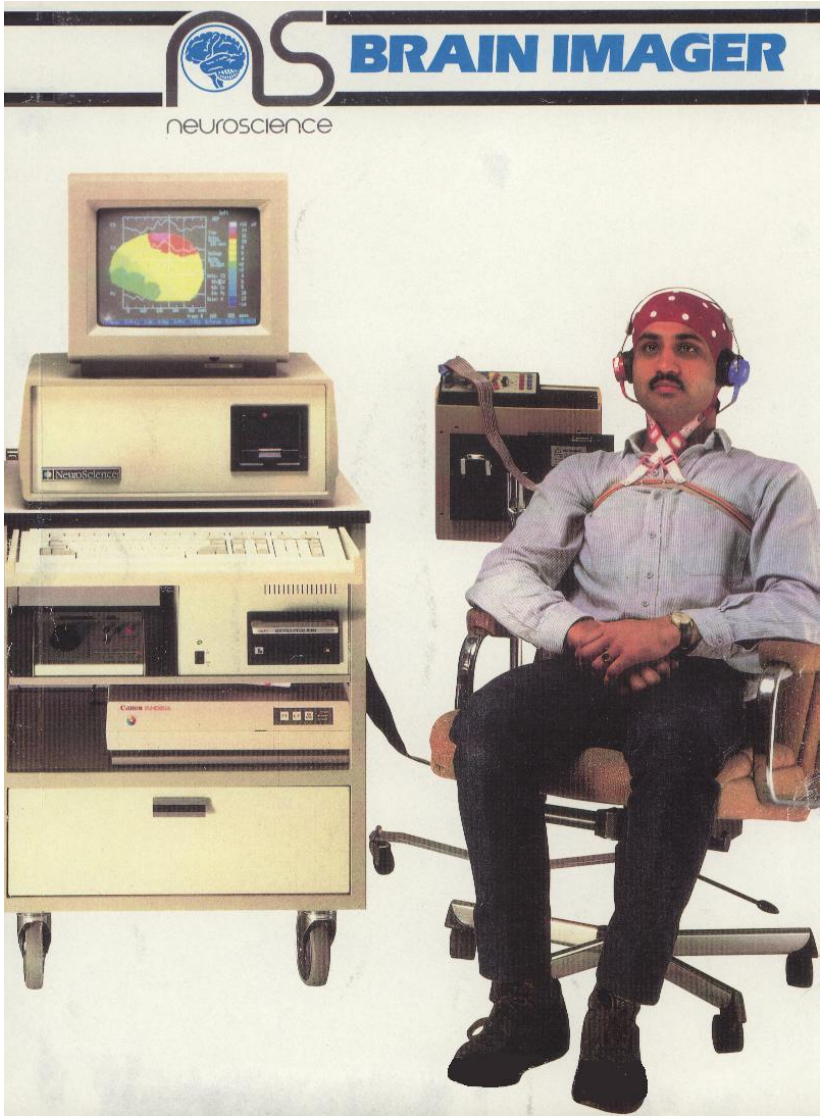

Dopamine Pathways
Serotonin Pathways
Frontal cortex
Striatum
Substantia nigra
Nucleus accumbens
VTA
Hippocampus
Raphe nucleus
Functions
• Reward (motivation)
• Pleasure, euphoria
• Motor function (fine tuning)
• Compulsion
• Perseveration
Functions
• Mood
• Memory processing
• Sleep
• Cognition

CHOCOLATE AND BRAIN ACTIVATION



Martin (1998)

EEG response to synthetic/real food odour


BRAIN IMAGER
neuroscience

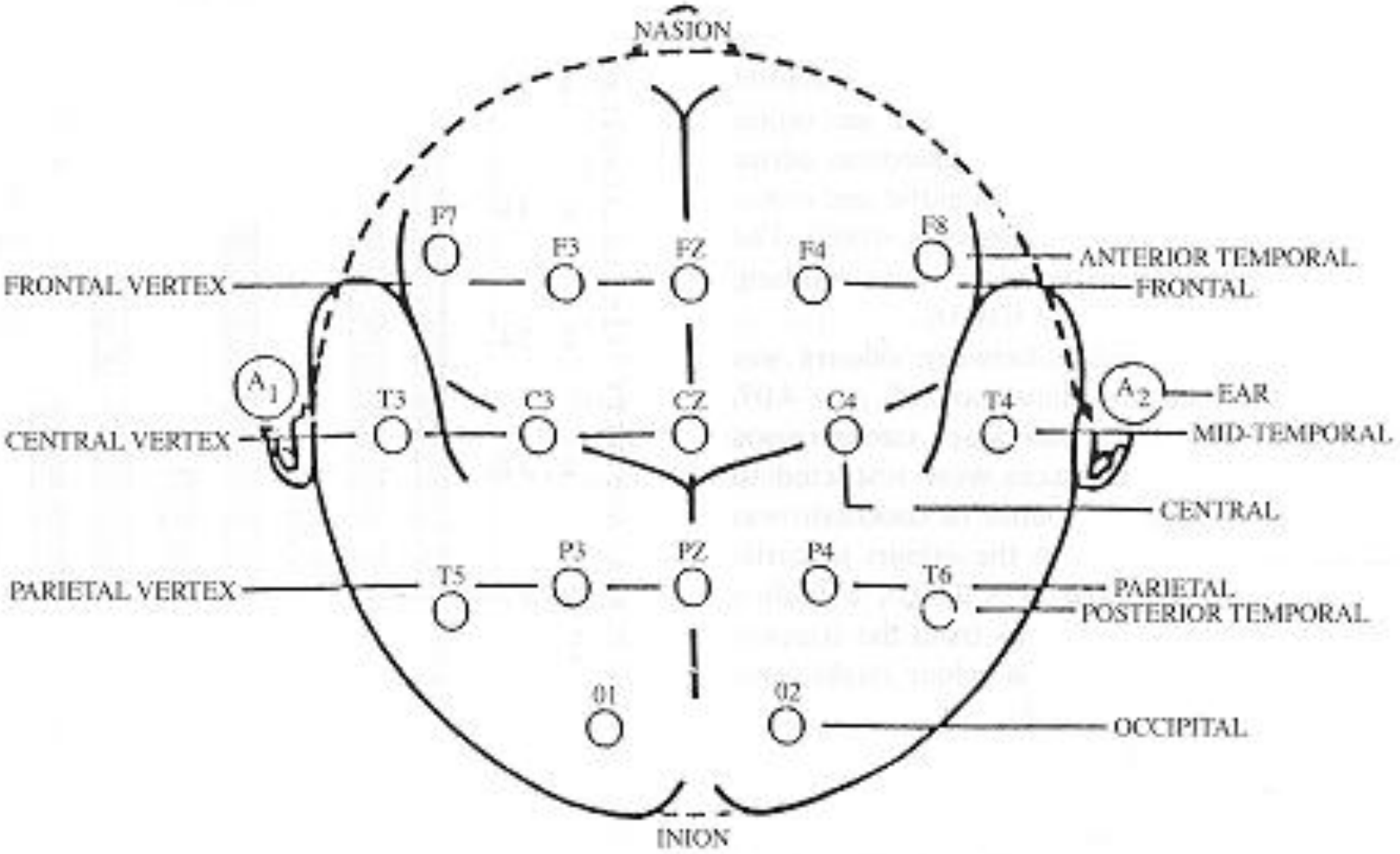
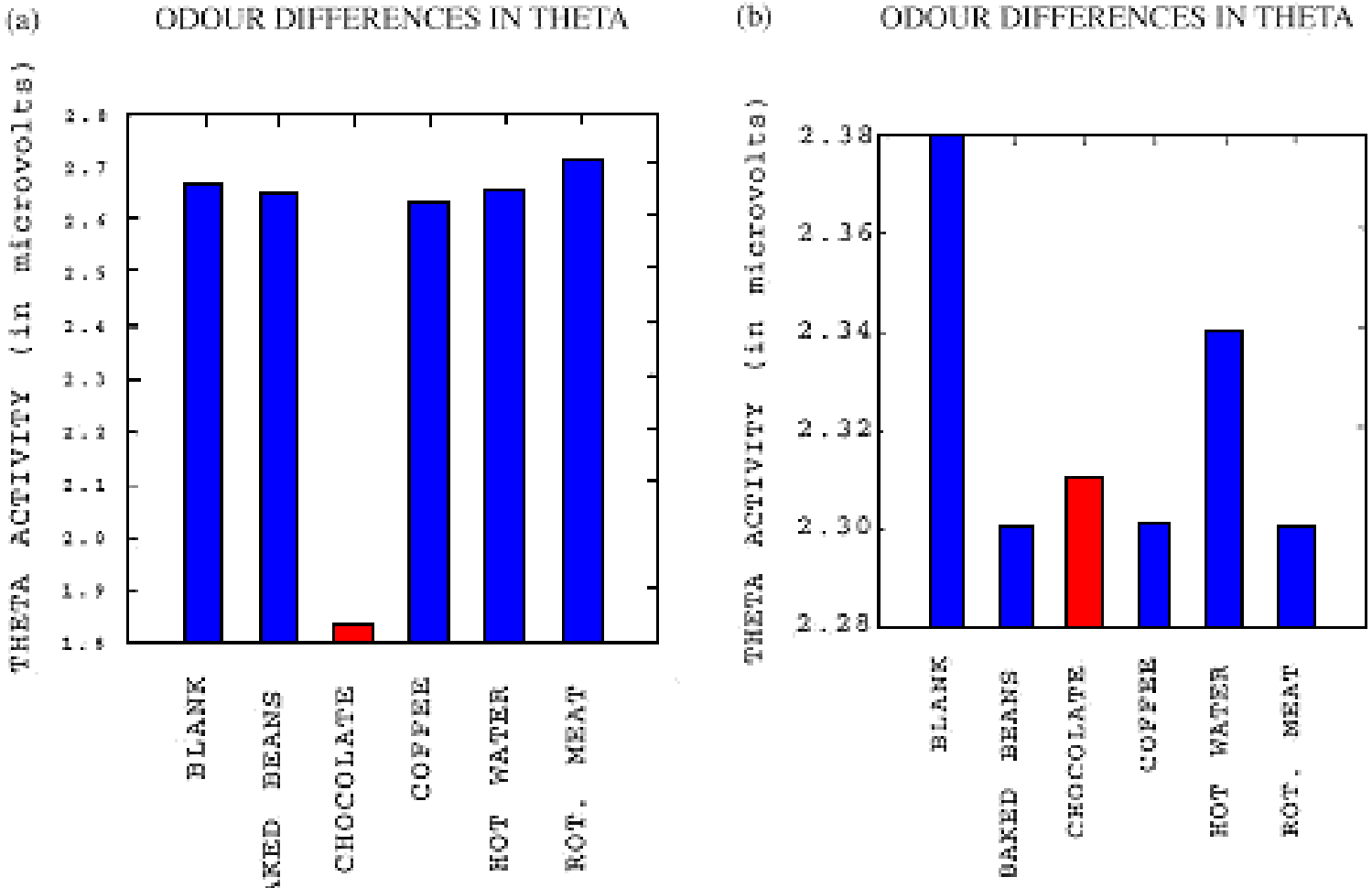


Fig. 1. An illustration of the 19 electrode sites employed.

ODOUR DIFFERENCES IN THETA
THETA ACTIVITY (in microvolts)
2.38
2.36
2.3
2.32
2.30
BLANK
ALMOND
CHOCOLATE
CUMIN
SPEARMINT
STRAWBERRY
VEGETABLE
ODOUR


(a)
ODOUR DIFFERENCES IN THETA
THETA ACTIVITY (in microvolts)
BLANK
BAKED BEANS
CHOCOLATE
COFFEE
HOT WATER
HOT. MEAT
(b)
ODOUR DIFFERENCES IN THETA
THETA ACTIVITY (in microvolts)
2.38
2.36
2.34
2.32
2.30
2.28
BLANK
BAKED BEANS
CHOCOLATE
COFFEE
HOT WATER
HOT. MEAT

EFFECT OF CHOCOLATE AROMA ON MOTOR BEHAVIOUR

- No effect on hand skill/co-ordination
- Participants less tense, depressed and confused

HOW DOES CHOCOLATE AFFECT ME?

- 73%- puts me in a good mood
- 60%- makes me happy
- 50%- makes my temper disappear
- 53%- makes me feel better
- 37%- makes me feel relaxed
- 63%- the smell makes me crave/want it more
- 67%- seeing somebody else eat makes me want it
- 70%- preferred the smell to cakes/sweets

PLEASURE CHART

1. GOING ON HOLIDAY
2. HAVING SEX
3. WATCHING A GOOD FILM
4. GOING FOR A WALK IN THE PARK
5. GOING TO THE BEACH
6. GOING SHOPPING
7. EATING CHOCOLATE
8. EATING ICE CREAM
9. READING A GOOD BOOK
10. DRINKING ALCOHOL

….TO BE CONTINUED

THE PSYCHOLOGY OF CHOCOLATE

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